

CLAIMS

1. A method for use in generating one or more data sequences for spread spectrum communications, the method comprising:
 - 5 serially generating a Gold code sequence by, for each count value i of a plurality of count values:
 - retrieving from memory a bit of a pseudorandom noise (PN) sequence corresponding to an $(i+n)$ th position in the PN sequence, where n is a fixed integer value;
 - 10 retrieving from memory a bit of the PN sequence corresponding to an $(q*i)$ th position in the PN sequence, where q is a fixed integer value; and
 - adding the bit corresponding to the $(i+n)$ th position with the bit corresponding to the $(q*i)$ th position.
- 15 2. The method according to claim 1, further comprising:
 - wherein retrieving from the memory comprises retrieving from a read-only memory (ROM).
- 20 3. The method according to claim 1 wherein, for serially generating the Gold code sequence, the method further comprising:
 - adding n and the count value i for each count value i of the plurality of count values.

4. The method according to claim 1 wherein, for serially generating the Gold code sequence, the method further comprises:

multiplying q and the count value i for each count value i of the plurality of count values.

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5. The method according to claim 1, further comprising:

wherein retrieving from memory a bit of the PN sequence corresponding to the $(i+n)$ th position comprises applying an $(i+n)$ value to the address inputs of the memory; and

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wherein retrieving from memory a bit of the PN sequence corresponding to the $(q*i)$ th position comprises applying an $(q*i)$ value to the address inputs of the memory.

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6. The method according to claim 1, wherein the Gold code sequence is a first Gold code sequence, the method further comprising:

serially generating a second Gold code sequence by, for each count value i of the plurality of count values:

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retrieving from memory a bit of the PN sequence corresponding to the $(i+n+m)$ th position in the PN sequence, where " m " is a fixed integer value;

retrieving from memory a bit of the PN sequence corresponding to the $(q*i + q*m)$ th position in the PN sequence; and

adding the bit corresponding to the $(i+n+m)$ th position with the bit corresponding to the $(q*i + q*m)$ th position.

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7. A method for use in generating one or more data sequences for spread spectrum communications, the method comprising:

serially generating a Gold code sequence by, for each count value i of a plurality of count values:

5 (a) retrieving from memory a bit of a pseudorandom noise (PN) sequence corresponding to an $(i+n)$ th position in the PN sequence, where n is a fixed integer value;

(b) retrieving from memory a bit of the PN sequence corresponding to an $(q*i + k)$ th position in the PN sequence, where " q " is a fixed integer value, and " k " may be 0, 1, 2, ...; and
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(c) adding the bit corresponding to the $(i+n)$ th position with the bit corresponding to the $(q*i + k)$ th position.

8. A method for use in generating a Gold code from a pseudorandom noise (PN) sequence stored in memory, the method comprising:
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for each count value " i " of a plurality of count values:

retrieving from memory a bit of the PN sequence corresponding to an $(i+n)$ th position in the PN sequence, where " n " is a fixed integer value;

retrieving from memory a bit of the PN sequence corresponding to an $(q*i)$ th position in the PN sequence, where q is a fixed integer value; and
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adding the bit corresponding to the $(i+n)$ th position with the bit corresponding to the $(q*i)$ th position.

9. In a dual mode Code Division Multiple Access (CDMA), a method for generating an n th Gold code from a pseudorandom noise (PN) sequence stored sequentially in memory as $x(0)$, $x(1)$, ..., the method comprising the steps of:

5 accessing the memory sequentially starting from location " n " in order to generate the sequence $x(i+n)$, where n is a fixed integer value;

 accessing the memory non-sequentially starting from a first location (k) and then accessing each q th location in order to generate the sequence $x(q \cdot i + k)$; and

10 adding on a bit-by-bit basis the resulting two retrieved sequences $x(i+n)$ and $x(q \cdot i + k)$.

10. A method of generating a complex Gold Code sequence, $Z_{2n}(i)$, applicable to the Universal Mobile Telephone Service (UMTS) standard, where, " x " is a PN sequence stored sequentially as $x(0)$, $x(1)$, in memory, and $x(i)$ and $y(i)$ are two related sequences each having a length equal to $2M-1$, the method comprising the steps of:

 accessing from memory $x(i+n+m)$, $x(q \cdot i + q \cdot m)$, $x(i+n)$ and $x(q \cdot i)$; and
20 performing the equation:

$$Z_{2n}(i) = x(i + n) + x(q \cdot i) + j[x(i + n + m) + x(q \cdot i + q \cdot m)]$$

where, " n " and " q " are fixed integer values.

11. A data sequence generator for serially generating one or more data sequences, the data sequence generator comprising:

memory;

data stored in said memory;

5 the data comprising a pseudo-random noise (PN) sequence;

a counting device;

a first adder, including:

a first input coupled to an output of the counting device;

a second input which receives a value n ;

10 a multiplier, including:

a first input coupled to the output of the counting device;

a second input which receives a value q ;

a first multiplexer, including:

a first input coupled to an output of the first adder;

15 a second input coupled to an output of the multiplier; and

an output for coupling to memory address inputs of the

memory.

12. The data sequence generator according to claim 11, further
20 comprising:

the memory comprising a read-only memory (ROM).

13. The data sequence generator according to claim 11, further comprising:

25 an output of the memory to provide serially-generated PN sequences responsive to the counting device.

14. The data sequence generator according to claim 11, further comprising:

a first latch having an input coupled to an output of the memory;

a second latch having an input coupled to the output of the memory;

5 a second adder, including:

a first input coupled to an output of the first latch;

a second input coupled to an output of the second latch; and

an output to provide a serially-generated Gold code sequence.

10 15. The data sequence generator according to claim 11, further comprising:

a second multiplexer, including:

a first input coupled to the output of the first multiplexer;

a second input coupled to the output of the counting device;

15 and

an output coupled to the memory address inputs of the memory.

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16. The data sequence generator according to claim 11, further comprising:

a first latch having an input coupled to an output of the memory;

a second latch having an input coupled to the output of the memory;

5 a second adder, including:

a first input coupled to an output of the first latch;

a second input coupled to an output of the second latch;

an output to provide a serially-generated Gold code sequence;

a second multiplexer, including:

10 a first input coupled to the output of the second adder;

a second input coupled to the output of the memory; and

an output to provide, in a time-multiplexed fashion, a serially-generated PN sequence and the serially-generated Gold code sequence.

17. The data sequence generator according to claim 11, further comprising:

a second multiplexer, including:

a first input coupled to the output of the first multiplexer;

5 a second input coupled to the output of the counting device;

an output coupled to the memory address inputs of the memory;

a first latch having an input coupled to an output of the memory;

a second latch having an input coupled to the output of the memory;

10 a second adder, including:

a first input coupled to an output of the first latch;

a second input coupled to an output of the second latch;

an output to provide a serially-generated Gold code sequence;

a third multiplexer, including:

15 a first input coupled to the output of the second adder;

a second input coupled to the output of the memory; and

an output to provide, in a time-multiplexed fashion, a serially-generated PN sequence and a serially-generated Gold code sequence.

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18. A data sequence generator, comprising:
- a read-only memory (ROM) storing a pseudo-random noise (PN) sequence;
 - a counter;
 - 5 a first adder, including:
 - a first input coupled to the output of the counter;
 - a second input which receives a value n ;
 - a multiplier, including:
 - a first input coupled to the output of the counter;
 - 10 a second input which receives a value q ;
 - a first multiplexer, including:
 - a first input coupled to an output of the first adder;
 - a second input coupled to an output of the multiplier;
 - a second multiplexer, including:
 - 15 a first input coupled to an output of the first multiplexer;
 - a second input coupled to the output of the counter; and
 - an output coupled to memory address inputs of the ROM.
19. The data sequence generator according to claim 18, further
- 20 comprising:
- a first latch coupled to an output of the ROM;
 - a second latch coupled to the output of the ROM;
 - a second adder, including:
 - a first input coupled to an output of the first latch;
 - 25 a second input coupled to an output of the second latch; and
 - an output to provide a Gold Code sequence.

20. The data sequence generator according to claim 18, further comprising:

a first latch coupled to an output of the ROM;

a second latch coupled to the output of the ROM;

5 a second adder, including:

a first input coupled to an output of the first latch;

a second input coupled to an output of the second latch;

a third multiplexer, including:

a first input coupled to the output of the ROM;

10 a second input coupled to an output of the second adder; and

an output to selectively provide the PN sequence and a Gold Code sequence.

15 21. The data sequence generator according to claim 20, wherein the ROM comprises a first read-only memory (ROM) and a second ROM and the output of the second multiplexer is coupled to memory address inputs of both the first and the second ROM;

a first PN sequence is stored in the first ROM and a second PN
20 sequence is stored in the second ROM;

the first and second latches are coupled to the output of the first ROM;
and

the first input of the third multiplexer is coupled to the output of the
second ROM.

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22. A data sequence generator for use in direct sequence spread spectrum (DSSS) communications, comprising:

memory;

a pseudo-random noise (PN) sequence stored in the memory;

5 a counter for use in generating each count value i of a plurality of count values;

an output of the memory to provide, for each count value i received at memory address inputs, a bit of the PN sequence corresponding to the (i) th position in the PN sequence;

10 an output of the memory to provide, for each $(i+n)$ value received at the memory address inputs, a bit of the PN sequence corresponding to the $(i+n)$ th position in the PN sequence;

an output of the memory to provide, for each $(q \cdot i)$ value received at the memory address inputs, a bit of the PN sequence corresponding to the $(q \cdot i)$ th position in the PN sequence; and

15 an adder to provide a sum of the bit corresponding to the $(i+n)$ th position and the bit corresponding to the $(q \cdot i)$ th position, to thereby provide a Gold code sequence.

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